CEE 492: Data Science for CEE, Fall 2022

THIS SYLLABUS IS SUBJECT TO CHANGE! Please check back throughout the course.

Basic Course Information

- Department: Civil and Environmental Engineering
- Title: CEE 492: Data Science for Civil and Environmental Engineering
- Credits: 3 for Undergraduates, 4 for Graduate Students
- Semester: Fall 2022
- Meeting time and location: 12-1:20 on Tuesdays and Thursdays in Room 1017 CEE Hydrosystems.
- First day of instruction: 8/23/2022
- Last day of instruction: 12/6/2021 (final exam on 12/13/2021)

Basic Instructor Information

- Instructor: Prof. Christopher Tessum, PhD
- Office: 3213 Newmark Civil Engineering Laboratory
- Office hours:
  - Tessum: 11:00-12:00 on Thursdays in Room 1017 CEE Hydrosystems
  - Liu: 13:20-14:20 on Tuesdays in Room 1017 CEE Hydrosystems or the common area outside of it.
- Website: https://cee.illinois.edu/directory/profile/ctessum
- Teaching assistant: Jialin Liu

Description of the course

Welcome to CEE Data Science! This semester, you will learn to leverage data to study civil and environmental engineering problems, identify patterns, and make actionable insights. This course includes training in computational thinking and exploratory data analysis; data processing techniques including singular value decomposition, principal component analysis, and fourier and wavelet transforms; and machine learning techniques including k-means, classification trees, neural networks, and neural differential equations.

This course differs from other available machine learning and data science courses in that it focuses on civil and environmental engineering problems and the methods used to solve them. In particular, this course emphasizes working with dynamical systems that generate spatiotemporal data, which are common in physical science but less common in data science when applied to other disciplines.

By the end of the semester, you will be able to:

1. Use software tools for data processing and visualization, signal processing, and machine learning to
2. Retrieve, manipulate, and analyze data; and
3. Make inferences and predictions about the built and natural environment.

Specifically, upon completion of this course, you should be proficient in the following **course learning objectives**:

1. When given a mathematical equation or the description of an algorithm, to use computational thinking to create a software implementation of that equation or algorithm.
2. To carry out exploratory data analysis to visualize, summarize, and explain an unfamiliar dataset.
3. To use a distributed version control system to collaborate on a project.

4. To choose and execute coordinate transforms represent and interpret the underlying patterns in a dataset.
5. To apply the gradient descent algorithm to minimize error between a model prediction and observations.
6. To design and implement machine learning models to cluster or predict a dependent variable in a dataset when given independent variables.
7. To monitor machine-learned models for bias using disaggregated testing.

This course will help you to gain the skills and tools necessary to make the most of the great increases in the amount and quality of data related to civil and environmental engineering that is being collected and stored.

Because data science methods are used across a number of different industries and instructional materials are readily available, this course will include readings and video lectures from across the internet. We will focus our face-to-face time on hands-on practice with the tools and concepts we are learning in this class. For students taking the class for four credits, it will include semester-long group projects; students will choose project topics at the beginning of the semester and will apply the concepts learned in the class to their projects as the semester progresses.

Prerequisites

- CEE 202;
- CEE300, 330 or 360; and
- CS 101 or equivalent.

Course Structure

This course is structured as a series of modules, with each module containing recorded lectures, readings, and quizzes to be completed before each class meeting. Class meetings will be hybrid in-person and on Zoom, and will focus on hands-on application of the material that was covered in recorded lectures and readings through the use of in-class worksheets. The in-class worksheets will be graded, but will not count toward the final grade. Instead, students who have an average worksheet score of at least 90% (averaged among all worksheets) will be allowed to drop their lowest-scoring midterm exam. Near the beginning or the semester, 4-credit students will choose a topic for a project, which they will work on throughout the semester, applying the concepts that we learn in class. Additionally, students will complete homework assignments, 3 midterms and a final exam.

Course Requirements and Assessment Overview

- Grades will be assigned based on several types of deliverables:
  - Pre-lecture quizzes: 5% of final grade
  - In-class worksheets: 11% of final grade. (70% of points can be made up by completing the post-class worksheet review. Online students can get 100% of points by completing the post-class worksheet review.)
  - Homeworks: 20% of final grade
  - Midterm exams: 39% of final grade (13% each).
  - Course project (4-credit students only): 25% of final grade:
    - 3% for project selection and introduction,
    - 3% for exploratory analysis,
    - 3% for preliminary modeling,
    - 3% for report rough draft,
    - and 13% for final report and presentation.

    - Extra credit: Students can create “Tiktok-style” videos explaining or reviewing the concepts covered in the course. For each module in the course, the creator of best video (as judged by the instructor) will receive **1% extra credit** toward their overall grade for the class. Videos with multiple authors can split the extra credit among the authors.
- Graduate students are expected to register for 4 credits and undergraduates can choose between 3 and 4 credits. For 3-credit students, there will be no course project and the weights of the other assessments will be scaled accordingly.
- Letter grades will be assigned according to the following scale:
    - 97-100: A+
    - 93-96.9: A
    - 90-92.9: A-
    - 87-89.9: B+
    - 83-86.9: B
    - 80-82.9: B-
    - 77-79.9: C+
    - 73-76.9: C
    - 70-72.9: C-
    - 67-69.9: D+
    - 63-66.9: D
    - 60-62.9: D-
    - Below 59.5: F

Homeworks and Exams

Homeworks and Exams will be done through PrairieLearn. In assigning these types of homeworks and exams, I’m placing emphasis on **mastery**. The idea is to keep doing questions until you master the underlying concept or method. Once you do, you should be able to answer these questions very quickly.

Important: When you log in to PrairieLearn, choose “Log in with Illinois” rather than “Log in with Google” or “Log in with Microsoft”. The UIUC login is the only one that will work.

Homeworks

For the homeworks, I try to encourage preparation for class before a module starts, so if you finish all of the questions completely before the first meeting time for the module, you will receive 110% of the available points. Questions finished between the first and second meeting times of the module receive 100%, and questions finished up to two weeks after the module ends can receive 80%.

Note that new homeworks are assigned most weeks, so if you don’t stay ahead, it can be easy to fall behind.

Exams

Exams are also administered using PrairieLearn. For exams, partial credit usually isn’t given, but you can try each problem more than once, with a decreasing number of points possible for each try.

Learning Resources

- Students are expected to bring a laptop to class, and have use of one and an internet connection for homeworks and pre-class activities.

- There is no required textbook to purchase. However, much of the course follows the book *Data Driven Science and Engineering* by Brunton and Kutz. The book includes a freely avilable pdf version and lecture videos, is also available for sale in hardcover and ebook formats.
- The course also includes content from the Julia learning resources, which is also a good resource for learning Julia in general. The free course *Introduction to Computational thinking* from MIT is particularly well done.
- For students that want to continue beyond the material covered in this course, there is *Parallel Computing and Scientific Machine Learning* (another course from MIT) and *Deep Learning* by Goodfellow, Bengio, and Courville.

Policies

Inclusive Environment

The effectiveness of this course is dependent upon the creation of an encouraging and safe classroom environment. Exclusionary, offensive or harmful speech (such as racism, sexism, homophobia, transphobia, etc.) will not be tolerated and in some cases subject to University harassment procedures. We are all responsible for creating a positive and safe environment that allows all students equal respect and comfort. I expect each of you to help establish and maintain and environment where you and your peers can contribute without fear of ridicule or intolerant or offensive language.

If you witness or experience racism, discrimination, micro-aggressions, or other offensive behavior, you are encouraged to bring this to the attention of the course director if you feel comfortable. You can also report these behaviors to the Bias Assessment and Response Team (BART) (https://bart.illinois.edu/). Based on your report, BART members will follow up and reach out to students to make sure they have the support they need to be healthy and safe. If the reported behavior also violates university policy, staff in the Office for Student Conflict Resolution may respond as well and will take appropriate action.

Accommodations

To obtain disability-related academic adjustments and/or auxiliary aids, students should contact both the instructor and the Disability Resources and Educational Services (DRES) as soon as possible. You can contact DRES at 1207 S. Oak Street, Champaign, (217) 333-1970, or via email at disability@illinois.edu.

Participation

Active participation in the online learning environment is vital to your success in this course. Depending on your course, you may be asked to engage in online discussions and other interactive learning environments that invite your active participation and involvement with other students and your instructor.

Student Commitment

By registering for this course, you commit to self-motivated study, participation in online course activities, and timely submission of all assignments. Furthermore, you commit to accessing the course website and checking email at least four days per week (daily for 4-week courses).

The University guidelines for course credit hours are posted here. In summary, students in a 3-credit class are expected spend at least 6 hours per week, and students in a 4-credit class are expected to

spend at least 8 hours per week, working outside of class times on readings, assigned lectures, assignments, projects, and test preparation.

It is my goal for this class to follow these guidelines so let me know if you think it does not (keeping in mind that the guidelines are for the *minimum* effort requirements).

Deadlines

If you are unable to meet a particular deadline, it is your responsibility to make prior arrangements with the instructor for that given week. Otherwise, work submitted later than 1 day late will receive 10% penalty, and work submitted later than 2 days late will not be considered for grading unless consent has been given by the instructor. PrairieLearn assignments have a separate policies for late submission which are shown on the PrairieLearn website.

Regrades

Requests for regrading homeworks, exams, and project deliverables must be submitted in writing within one week of receiving the initial grade, and must include a written explanation of the reason for the regrade request.

Instructor Responses

Instructor Feedback Turnaround Time

Questions posted to CampusWire generally will be answered within 24 hours. Questions may be answered on weekends but this should not be expected.

Assignments submitted online will generally be reviewed and graded by the course instructor within 5 business days. Exams, essays, and term papers will generally be graded within 10 business days.

Contacting the instructor

For the fastest response response, the best way to contact the instructor is by attending office hours or posting questions to the CampusWire.

The instructor will not respond to phone calls and may not respond to emails. If you must send an email, include a subject line that identifies the course number and nature of your question. Please don't be offended if you are asked to repost your question on CampusWire to allow the instructional team to efficiently answer all questions.

Academic Integrity

Academic dishonesty will not be tolerated. Examples of academic dishonesty include the following:

- Cheating
- Fabrication
- Facilitating infractions of academic integrity
- Plagiarism
- Bribes, favors, and threats
- Academic interference
- Examination by proxy
- Grade tampering

- Non-original works

Should an incident arise in which a student is thought to have violated academic integrity, the student will be processed under the disciplinary policy set forth in the Illinois Academic Integrity Policy. If you do not understand relevant definitions of academic infractions, contact your instructor for an explanation within the first week of class.

Giving and receiving advice on projects and homework assignments is acceptable and encouraged. However, it is expected that help be given in general terms and in the form of natural language sentences (for example, English) rather than in the form of mathematical equations, algorithms, computer code, or anything else that could be copied and pasted into the recipient's answer. Similarly, students are encouraged to consult the Internet, but copying and pasting code from the Internet and submitting it for the class is not acceptable. The work that each student submits is expected to be their own, written with their own hand or typed on their own keyboard. For group work, work can be submitted by a single member but must include substantial contributions of all group members. Please contact the instructor to discuss instances of non-contributing group members.

Copyright

Student Content

Participants in University of Illinois courses retain copyright of all assignments and posts they complete; however, all materials may be used for educational purposes within the given course. In group projects, only the portion of the work completed by a particular individual is copyrighted by that individual. The University of Illinois may request that students' materials be shared with future courses, but such sharing will only be done with the students' consent. The information that students submit during a course may, however, be used for the purposes of administrative data collection and research. No personal information is retained without the students' consent.

Non-student Content

Everything on this site and within University of Illinois courses is copyrighted. The copyrights of all non-student work are owned by the University of Illinois Board of Trustees, except in approved cases where the original creator retains copyright of the material. Copyrights to external links are owned by or are the responsibility of those external sites. Students are free to view and print material from this site so long as

- The material is used for informational purposes only.
- The material is used for noncommercial purposes only.
- Copies of any material include the respective copyright notice.
- These materials may not be mirrored or reproduced on non-University of Illinois websites without the express written permission of the University of Illinois Board of Trustees. To request permission, please contact the academic unit for the program.

Student Behavior

Student Conduct

Students are expected to behave in accordance with the penal and civil statutes of all applicable local, state, and federal governments, with the rules and regulations of the Board of Regents, and with university regulations and administrative rules.

For more information about the student code and handbook, see the CITL course policies page.

Netiquette

In any social interaction, certain rules of etiquette are expected and contribute to more enjoyable and productive communication. The following are tips for interacting online via email or discussion board messages, adapted from guidelines originally compiled by Chuq Von Rospach and Gene Spafford (1995):

- Remember that the person receiving your message is someone like you, deserving and appreciating courtesy and respect.
- Be brief; succinct, thoughtful messages have the greatest effect.
- Your messages reflect on you personally; take time to make sure that you are proud of their form and content.
- Use descriptive subject headings in your emails.
- Think about your audience and the relevance of your messages.
- Be careful when you use humor and sarcasm; absent the voice inflections and body language that aid face-to-face communication, internet messages are easy to misinterpret.
- When making follow-up comments, summarize the parts of the message to which you are responding.
- Avoid repeating what has already been said; needless repetition is ineffective communication.
- Cite appropriate references whenever using someone else's ideas, thoughts, or words.

Communications

Daily Contact

Your daily contact should be in class or on Zoom, in office hours, or on CampusWire.

Course Questions

Questions pertaining to the course should be posted on CampusWire. You can get to this forum from the course home page. Posting questions here allows everyone to benefit from the answers. If you have a question, someone else is probably wondering the same thing. Anyone submitting a question via email will be directed to resubmit the question to the CampusWire. Also, participants should not hesitate to answer questions posed by peers if they know the answers and the instructor has not yet responded. This not only expedites the process but also encourages peer interaction and support.

Personal and Grade-Related Questions

Questions of a personal nature can be sent as a direct message on CampusWire, or if desired may be sent to the instructor's email address. If you need to send an email, include a subject that identifies the course number and nature of your question.

Emergencies

If you have an emergency that will keep you from participating in the course, please notify your instructor on CampusWire or using email. Provide callback information in your message (if necessary). You should also notify your program director of any emergencies.

Sexual Misconduct Policy and Reporting

The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the university's Title IX and Disability Office.

In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options.

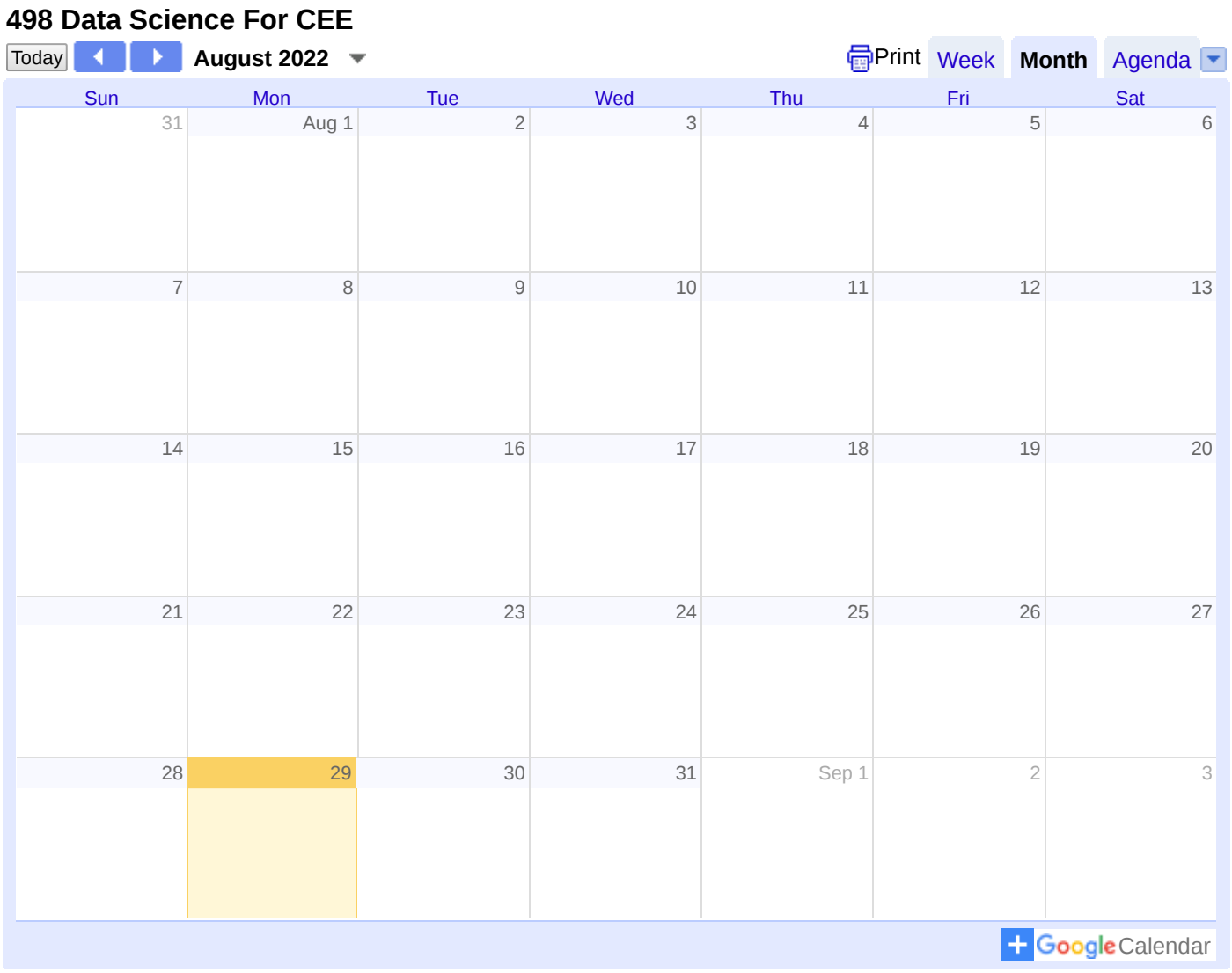
A list of the designated university employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found in the Confidential Resources section. Other information about resources and reporting is available at wecare.illinois.edu.

Student Wellness Resources

The University of Illinois strives to promote student success through the support of student psychological and emotional well-being. Please take advantage of the resources listed on the Student Affairs website.

Schedule

Course calendar



Modules

Module	Start Date	Contact Hours
0. Introduction and motivating problems	8/23/2022	1.3
1. Linear algebra review and intro to the Julia Language	8/25/2022	4.0
2. Open reproducible science	9/6/2022	4.0
3. Singular value decomposition and principle component analysis	9/15/2022	2.7
4. Fourier and wavelet transforms	9/22/2022	4.0
5. Regression	10/6/2022	4.0
6. Machine learning	10/20/2022	2.7
7. Neural networks	10/27/2022	4.0
8. Data-driven dynamical systems	11/8/2022	4.0
9. Fairness in machine learning	11/17/2022	1.3
-1. Fall break	11/22/2022	2.7
10. Final projects	11/29/2022	4.0

Homeworks

Title	Assigned	Deadline for 110% Credit	Deadline for 100% Credit	Deadline for 80% Credit
HW1: Linear algebra review and intro to the Julia Language	8/23/2022	Thu 8/25/2022, 12:00 CDT	Fri 9/9/2022, 17:00 CDT	Fri 9/23/2022, 17:00 CDT
HW2: Open reproducible science	8/30/2022	Tue 9/6/2022, 12:00 CDT	Fri 9/23/2022, 17:00 CDT	Fri 10/7/2022, 17:00 CDT
HW3: Singular value decomposition and principle component analysis	9/8/2022	Thu 9/15/2022, 12:00 CDT	Fri 9/30/2022, 17:00 CDT	Fri 10/14/2022, 17:00 CDT
HW4: Fourier and wavelet transforms	9/15/2022	Thu 9/22/2022, 12:00 CDT	Fri 10/14/2022, 17:00 CDT	Fri 10/28/2022, 17:00 CDT
HW5: Regression	9/29/2022	Thu 10/6/2022, 12:00 CDT	Fri 10/28/2022, 17:00 CDT	Fri 11/11/2022, 16:00 CST
HW6: Machine learning	10/13/2022	Thu 10/20/2022, 12:00 CDT	Fri 11/4/2022, 17:00 CDT	Fri 11/18/2022, 16:00 CST
HW7: Neural networks	10/20/2022	Thu 10/27/2022, 12:00 CDT	Fri 11/11/2022, 17:00 CST	Fri 11/25/2022, 17:00 CST
HW8: Data-driven dynamical systems	11/1/2022	Tue 11/8/2022, 12:00 CST	Fri 11/25/2022, 17:00 CST	Fri 12/9/2022, 17:00 CST

Project Deliverables

Title	Assigned	Due
1. Project selection and introduction	2022-08-23 12:00:00 -0500 CDT	2022-09-23 17:00:00 -0500 CDT
2. Exploratory analysis	2022-09-23 17:00:00 -0500 CDT	2022-10-28 17:00:00 -0500 CDT

Title	Assigned	Due
3. Preliminary modeling	2022-10-28 17:00:00 -0500 CDT	2022-11-11 17:00:00 -0600 CST
4. Report rough draft	2022-11-11 17:00:00 -0600 CST	2022-11-18 17:00:00 -0600 CST
5. Final report and presentation	2022-11-18 17:00:00 -0600 CST	2022-12-02 17:00:00 -0600 CST

Exams

- Exam 1: Computational thinking: Tue 9/27/2022, 12:00 CDT
- Exam 2: Coordinate transforms: Tue 10/18/2022, 12:00 CDT
- Final Exam: Tue 12/13/2022, 08:00 CST—Wed 12/14/2022, 08:00 CST

Modules

Module 0: Introduction and motivating problems

Module 0 Overview: In this module we will get to know each other and cover the format of the course, its contents, and expectations.

Module 0 Class sessions:

- Tue 8/23/2022, 12:00 CDT: Introduction

Module 1: Linear algebra review and intro to the Julia Language

Module 1 Overview: In this course, we will use two key tools: linear algebra and the Julia programming language. You should already be familiar with linear algebra, so we will only briefly review it here. You're not expected to know anything about the Julia language before starting this class, but you are expected to have completed a basic computer programming class (similar to CS101) using some computing language.

Module 1 Learning Objectives: By the end of this module, you should be able to:

- Operate the Julia language programming interface, using both the REPL and Pluto notebooks
- Use variables, arrays, conditional statements, loops, and functions to process data using Julia
- Use Julia's built-in and library functions to operate on text and data
- Solve systems of equations using linear algebra in the Julia language
- Debug Julia programs to fix programming errors

Module 1 Class sessions:

- Thu 8/25/2022, 12:00 CDT: julia_basics_1
- Tue 8/30/2022, 12:00 CDT: julia_basics_2
- Thu 9/1/2022, 12:00 CDT: Linear algebra review

Module 2: Open reproducible science

Module 2 Overview: This module covers tools and methods for ensuring your work is correct, understandable, and reproducible.

Module 2 Learning Objectives: By the end of this module, you should be able to:

- Apply the theory of 'tidy data' to wrangle a tabular dataset into tidy format, using for example the `groupby`, and `combine` functions in DataFrames.jl
- Evaluate an unfamiliar dataset with exploratory statistical analysis, using for example the `filter` and `select` functions in DataFrames.jl as well as array indexing and basic descriptive statistics
- Create exploratory visualizations for tabular, array, and image data using Plots.jl and StatsPlots.jl
- Apply git and GitHub.com for distributed version control and collaboration on group projects

Module 2 Class sessions:

- Tue 9/6/2022, 12:00 CDT: Git and Github
- Thu 9/8/2022, 12:00 CDT: Visualization
- Tue 9/13/2022, 12:00 CDT: Data Wrangling

Module 3: Singular value decomposition and principle component analysis

Module 3 Overview: SVD and PCA fundamental algorithms for data processing and analysis. We will learn how they work and how they can be applied to gain insight from data.

Module 3 Learning Objectives: By the end of this module, you should be able to:

- Apply the SVD and PCA algorithms to create a low-rank approximation of a dataset
- Interpret the results of the algorithms in a given context, including the significance of the resulting values and how much of the variance in the original dataset is represented in the low-rank approximation

Module 3 Class sessions:

- Thu 9/15/2022, 12:00 CDT: Singular Value Decomposition
- Tue 9/20/2022, 12:00 CDT: Principal Components Analysis

Module 4: Fourier and wavelet transforms

Module 4 Overview: Fourier and wavelet transforms are powerful methods for coordinate transformation, data compression, and feature engineering and are used in almost every field of science and engineering.

Module 4 Learning Objectives: By the end of this module, you should be able to:

- Apply the FFT, Gabor transform, and Wavelet transform algorithms to determine the frequency spectra of a dataset
- Interpret the results of the algorithms in a given context, including the significance of the resulting values

Module 4 Class sessions:

- Thu 9/22/2022, 12:00 CDT: Fourier Series
- Tue 9/27/2022, 12:00 CDT: Exam 1: Computational thinking
- Thu 9/29/2022, 12:00 CDT: Fourier Transforms
- Tue 10/4/2022, 12:00 CDT: Spectrograms and Wavelets

Module 5: Regression

Module 5 Overview: In this module, we will learn how to use regression to predict the value of a dependent variable given a set of independent variables.

Module 5 Learning Objectives: By the end of this module, you should be able to:

- Apply the gradient descent algorithm to mimimize error between a model prediction and observations
- Design and implement a linear regression model to predict a dependent variable in a dataset when given independent variables
- Apply regularization to the model to avoid overfitting
- Apply feature selection and engineering and coordinate transformation to a dataset to improve regression performance

Module 5 Class sessions:

- Thu 10/6/2022, 12:00 CDT: Regression
- Tue 10/11/2022, 12:00 CDT: Regularization
- Thu 10/13/2022, 12:00 CDT: Model and feature selection
- Tue 10/18/2022, 12:00 CDT: Exam 2: Coordinate transforms

Module 6: Machine learning

Module 6 Overview: In this module, we learn about two popular machine learning algorithms: k-means and decision trees.

Module 6 Learning Objectives: By the end of this module, you should be able to:

- Implement the k-means algorithm to divide a dataset into clusters
- Design and implement a decision tree model to predict a dependent variable in a dataset when given independent variables

Module 6 Class sessions:

- Thu 10/20/2022, 12:00 CDT: k-Means clustering
- Tue 10/25/2022, 12:00 CDT: Classification trees

Module 7: Neural networks

Module 7 Overview: In this module, we will learn how to implement and use both fully-connected and convolutional neural networks.

Module 7 Learning Objectives: By the end of this module, you should be able to:

- Train a neural network to for regression and classification
- Identify and debug common problems with neural network training

Module 7 Class sessions:

- Thu 10/27/2022, 12:00 CDT: Neural networks 1
- Tue 11/1/2022, 12:00 CDT: Neural networks 2

- Thu 11/3/2022, 12:00 CDT: Convolutional neural networks

Module 8: Data-driven dynamical systems

Module 8 Overview: In this module, we will apply the machine learning techniques we have learned so far to dynamical systems and the differential equations that describe them.

Module 8 Learning Objectives: By the end of this module, you should be able to:

- Apply gradient descent to fit the parameters of a system of differential equations to observed data
- Implement a Neural ODE to make data-driven predictions of the evolution of a dynamical system

Module 8 Class sessions:

- Tue 11/8/2022, 12:00 CST: Voting Day! Check here for where to vote.
- Thu 11/10/2022, 12:00 CST: Parameter fitting for dynamical systems
- Tue 11/15/2022, 12:00 CST: Neural ordinary differential equations

Module 9: Fairness in machine learning

Module 9 Overview: Machine learning models can contain bias, which is especially important as these models become more integrated in to human society. We will learn how to detect and minimize this bias.

Module 9 Learning Objectives: By the end of this module, you should be able to:

- Use disaggregated testing to detect bias in machine learning models
- Design and construct models to minimize any detected bias

Module 9 Class sessions:

- Thu 11/17/2022, 12:00 CST: Fairness in machine learning

Module -1: Fall break

Module -1 Class sessions:

- Tue 11/22/2022, 12:00 CST: Fall break
- Thu 11/24/2022, 12:00 CST: Fall break

Module 10: Final projects

Module 10 Overview: In this module we will present the results of our semester projects.

Module 10 Class sessions:

- Tue 11/29/2022, 12:00 CST: Project workshop (or presentations?)
- Thu 12/1/2022, 12:00 CST: Final project presentations
- Tue 12/6/2022, 12:00 CST: Final project presentations